

(12) **United States Patent**  
**Jia**

(10) **Patent No.:** **US 7,837,471 B2**  
(45) **Date of Patent:** **Nov. 23, 2010**

(54) **DENTAL FILLING MATERIALS AND METHODS OF USE**

(75) Inventor: **Weitao Jia**, Wallingford, CT (US)

(73) Assignee: **Pentron Clinical Technologies, LLC**, Wallingford, CT (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

1,312,120 A	8/1919	Hurt
1,463,963 A	8/1923	Miller
1,469,992 A	10/1923	Card
1,641,844 A	9/1927	Fisher
1,649,508 A	11/1927	Carmichael

(Continued)

#### FOREIGN PATENT DOCUMENTS

(21) Appl. No.: **11/857,528**

DE 3408503 9/1984

(22) Filed: **Sep. 19, 2007**

(65) **Prior Publication Data**

US 2008/0020353 A1 Jan. 24, 2008

(Continued)

#### OTHER PUBLICATIONS

#### Related U.S. Application Data

(60) Division of application No. 10/914,057, filed on Aug. 6, 2004, now Pat. No. 7,303,817, which is a continuation-in-part of application No. 10/465,416, filed on Jun. 18, 2003, now Pat. No. 7,211,136, which is a continuation-in-part of application No. 10/304,371, filed on Nov. 26, 2002, now Pat. No. 7,204,875, and a continuation-in-part of application No. 10/279,609, filed on Oct. 24, 2002, now Pat. No. 7,204,874.

(60) Provisional application No. 60/336,500, filed on Oct. 24, 2001.

(51) **Int. Cl.**  
**A61C 5/02** (2006.01)

(52) **U.S. Cl.** ..... **433/224**

(58) **Field of Classification Search** ..... 433/81,  
433/102, 224

See application file for complete search history.

(56) **References Cited**

#### U.S. PATENT DOCUMENTS

277,943 A	5/1883	Richmond
644,297 A	2/1900	Metcalf
674,419 A	5/1901	Kinsman

Notification of Transmittal of the International Preliminary Examining Report with date of mailing Oct. 4, 2001.

(Continued)

*Primary Examiner*—Cris L Rodriguez

*Assistant Examiner*—Heidi M Eide

(74) *Attorney, Agent, or Firm*—Cantor Colburn LLP

(57) **ABSTRACT**

A dental filling material comprising an inner core and outer layer of material disposed and surrounding the inner core, both the inner core and outer layer of material each containing a thermoplastic polymer. The thermoplastic polymer may be biodegradable. A bioactive substance may also be included in the filling material. The thermoplastic polymer acts as a matrix for the bioactive substance. The composition may include other polymeric resins, fillers, plasticizers and other additives typically used in dental materials. The filling material is used for the filling of root canals.

**40 Claims, 8 Drawing Sheets**

